



AMAN PHARMACY COLLEGE

A Unit of Bhartiya Shikshan and Vikas Simiti Dholakhera

(Affiliated to RUHS and Approved by AICTE and PCI New Delhi)

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COURSE OUTCOMES – B PHARM (2022-2023)

S. No	Course Code	Course	Course outcomes
First Semester			
1	BP-101T	Human Anatomy and Physiology I –Theory	<p>CO1 - Explain the gross morphology and structure of various organs of human body.</p> <p>CO2 - Describe the various homeostatic mechanisms and their imbalances. Explain the pathological conditions of various organs.</p> <p>CO3 - Identify the various tissues and organs of different systems of human body and describe their functions. Describe the structure and functions of a cell.</p> <p>CO4 - Anatomy and physiology of special senses and nervous system.</p> <p>CO5 - Appreciate coordinated working pattern of organs of various systems.</p>
2	BP-102T	Pharmaceutical Analysis I - Theory	<p>CO1 - To understand the concept of concentration, calculation of a solution, preparation and standardization of a solution and its storage conditions.</p> <p>CO2 - Study the definition and description of errors, commonly developed during drug analysis and method to minimize them.</p> <p>CO3 - Understand the principle and methods involved in volumetric analysis to estimate the drugs</p> <p>CO4 - To know the different principles, methods and application of precipitation, complexometric, Gravimetric and diazotization titrations.</p> <p>CO5 - To understand the principle and techniques of electrochemical titrations for chemical analysis.</p>
3	BP-103T	Pharmaceutics I - Theory	<p>CO1 - Know the History of Profession of Pharmacy and knowledge about the development of different Pharmacopeias.</p> <p>CO2 - Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations.</p> <p>CO3 - Understand the professional way of Handling the Prescription.</p> <p>CO4 - Know the Adoption of the different techniques for the Preparations and Evaluation of various conventional dosage forms like Powders, Suppositories and liquid orals with their types.</p> <p>CO5 - Know various considerations in Development of different types of semi-solid dosage forms and to evaluate them to maintain their stability.</p>

4	BP-104T	Pharmaceutical Inorganic Chemistry - Theory	<p>CO1 - Explain the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals and well acquainted with the principles of limit tests.</p> <p>CO2 - Knowledge on various major intra and extra cellular fluids and electrolytes and their role.</p> <p>CO3 - Discuss the preparation, principle and methodology of several inorganic drugs</p> <p>CO4 - Understand the medicinal and pharmaceutical importance of inorganic Compounds.</p> <p>CO5 - To study various aspects of radiopharmaceuticals.</p>
5	BP-105T	Communication Skills - Theory	<p>CO1 - Understand communicate effectively both verbal and non-verbal.</p> <p>CO2 - Understand the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operation.</p> <p>CO3 - Acquire interview skills and group discussion.</p> <p>CO4 - Manage the team as a team player.</p> <p>CO5 - Develop leadership qualities and essentials.</p>
6	BP-106RBT	Remedial Biology - Theory	<p>CO1 - Know the classification and salient features of five kingdoms of life</p> <p>CO2 - Understand the basic components of anatomy and physiology of plant</p> <p>CO3 - Associate the physiology of animal with special reference to human</p> <p>CO4 - Explain morphology of flowering, plants and mineral nutrition</p> <p>CO5 - Describe plant growth and development</p>
7	BP-106RMT	Remedial Mathematics - Theory	<p>CO1 - Apply mathematical concepts and principles to perform computation for pharmaceutical sciences.</p> <p>CO2 - Solve the different types of problems by applying theory.</p> <p>CO3 - Create use and Analyse mathematical representation and mathematical relationship.</p> <p>CO4 - Explain the principles of matrix, algebra, analytical geometry, differential and calculus, differential equations.</p> <p>CO5 - Appreciate the important applications of mathematics in pharmacy.</p>
8	BP-107P	Human Anatomy and Physiology I - Practical	<p>CO1 - Perform the haematological tests in human subjects and interpret the results.</p> <p>CO2 - Record, monitor and document the vital physiological parameters of human subjects and interpret the results.</p> <p>CO3 - Describe the anatomical features of the important human tissues under the microscopical conditions.</p> <p>CO4 - Discuss the significance of various anatomical and physiological characteristics of the human body.</p> <p>CO5 - Appreciate coordinated working pattern of organs of various systems.</p>

9	BP-108P	Pharmaceutical Analysis I - Practical	<p>CO1 - Perform limit test and identify the impurities in the given compounds</p> <p>CO2 - Prepare standard solutions</p> <p>CO3 - Standardize the secondary standard solution by using primary standard solution</p> <p>CO4 - Determine the percentage purity of drugs by volumetric analysis with the help of normality</p> <p>CO5 - Determine the percentage purity of drugs by using electrochemical analysis.</p>
10	BP-109P	Pharmaceutics I - Practical	<p>CO1 - Compound some conventional solid, liquid and semisolid dosage forms.</p> <p>CO2 - Select an appropriate container and storage conditions for a product.</p> <p>CO3 - Label the pharmaceuticals.</p>
11	BP-110P	Pharmaceutical Inorganic Chemistry - Practical	<p>CO1 - The level of specific impurities in the given inorganic compounds by performing different limit tests.</p> <p>CO2 - Different chemical methods to prepare inorganic pharmaceuticals.</p> <p>CO3 - Perform identification tests as per Indian Pharmacopoeia.</p> <p>CO4 - Determine the impurities qualitatively by performing tests for purity.</p> <p>CO5 - Determine the Neutralizing capacity for antacids</p>
12	BP-111P	Communication Skills - Practical	<p>CO1 - Express basic communication verbal and non-verbal.</p> <p>CO2 - Demonstrate interview skills and group discussion.</p> <p>CO3 - Express pronunciation of both consonant sounds & vowel sounds and nouns.</p>
13	BP-112RBP	Remedial Biology - Practical	<p>CO1 - Explain about microscope, section cutting techniques, mounting, staining and permanent slide preparation</p> <p>CO2 - Handle cell, stem, root, leaf, seed, fruit, flower and their modifications.</p> <p>CO3 - Identify tissues, stem, root, leaf, seed, fruit and flower.</p>
Second Semester			
14	BP-210T	Human Anatomy and Physiology II - Theory	<p>CO1 - Explain the gross morphology, structure and functions of various organs of the human body.</p> <p>CO2 - Describe the various homeostatic mechanisms and their imbalances.</p> <p>CO3 - Identify the various tissues and organs of different systems of human body.</p> <p>CO4 - Perform the haematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.</p> <p>CO5 - Appreciate coordinated working pattern of different organs of each system.</p> <p>CO6 - Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.</p>

15	BP-202T	Pharmaceutical Organic Chemistry I - Theory	<p>CO1 - Knowledge of the definition, nomenclature, classification and the type of Isomerism of the organic compound.</p> <p>CO2 - Understanding of important physical properties important reactions and method of preparations of various functional groups.</p> <p>CO3 - Reactivity/stability and orientation of organic compounds.</p> <p>CO4 - Structure and application of organic compounds.</p> <p>CO5 - Identification and confirmation of organic compounds.</p>
16	BP-203T	Biochemistry - Theory	<p>CO1 - Able to understand different biomolecules and its biological role and bioenergetics</p> <p>CO2 - Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic application of enzymes</p> <p>CO3 - Understand the metabolism of nutrient molecules in physiological condition</p> <p>CO4 - Understand the metabolism of nutrient molecules in pathological condition</p> <p>CO5 - Understand the genetic organization of mammalian genome and important of DNA in the synthesis of RNA and proteins.</p>
17	BP-204T	Pathophysiology - Theory	<p>CO1 - Understand the principles of cell injury and cellular adaptation.</p> <p>CO2 - Understand/ revise the mechanisms involved in process of inflammation and repair.</p> <p>CO3 - Describe the aetiology and pathogenesis of selected diseases.</p> <p>CO4 - Develop knowledge of signs and symptoms of diseases.</p> <p>CO5 - Identify the complications of diseases.</p>
18	BP-205T	Computer Applications in Pharmacy - Theory	<p>CO1 - Explain the various types of applications of computers in pharmacy.</p> <p>CO2 - Explain bioinformatics and their impact in vaccine discover.</p> <p>CO3 - Understand the various types of databases and its applications.</p> <p>CO4 - Create data bases using MS access, SQL.</p> <p>CO5 - Identify the role of computers for data analysis in the field or pre-clinical development.</p>
19	BP-206T	Environmental Sciences - Theory	<p>CO1 - Create the awareness about environmental problems among learners.</p> <p>CO2 - Create awareness about ecosystems and their functions.,</p> <p>CO3 - Acquire skills to help the concern individuals in identifying and solving environmental problems.</p> <p>CO4 - Strive to attain harmony with nature.</p> <p>CO5 - Impact basic knowledge about environment and its allied problems.</p>

20	BP-207P	Human Anatomy and Physiology II - Practical	<p>CO1 – Understand human anatomy using specimen models</p> <p>CO2 – Demonstrate experiments on special senses</p> <p>CO3 – Demonstrate experimental functions on physiological systems</p>
21	BP-208P	Pharmaceutical Organic Chemistry I - Practical	<p>CO1 - Detect the extra elements present in compounds.</p> <p>CO2 - Identify organic compounds by systematic qualitative analysis.</p> <p>CO3 - Determine the boiling/melting point of organic compounds and derived compounds.</p> <p>CO4 - Preparation of suitable solid derivatives from organic compounds.</p> <p>CO5 - Develop skills to prepare stereo models containing various functional groups.</p>
22	BP-209P	Biochemistry - Practical	<p>CO1 - Perform and identify the carbohydrates</p> <p>CO2 - Perform and identify the proteins</p> <p>CO3 - Identify normal and abnormal constituents of urine</p> <p>CO4 - Estimate the quantity of reducing sugars by DNSA methods and proteins by biuret method</p> <p>CO5 - Determine the factors affecting enzyme activity and report it</p>
23	BP-210P	Computer Applications in Pharmacy - Practical	<p>CO1 - Use MS word to create questionnaires and other documentation related to pharmacy.</p> <p>CO2 - Retrieve the information of drug and its adverse effects using online tools.</p> <p>CO3 - Creating, mailing labels using label wizard, generating label in MS word.</p> <p>CO4 - Handle web and XML pages to exportable, forms and queries.</p>
Third Semester			
24	BP-301T	Pharmaceutical Organic Chemistry II - Theory	<p>CO1 - Basic knowledge regarding definitions, structure, chemistry, properties and its effects on organic compounds.</p> <p>CO2 - Write the reaction, name the reaction and mechanism of organic reactions.</p> <p>CO3 - Determination of various analytical constants.</p> <p>CO4 - To understand reactivity/ stability of organic compounds. Special emphasis on orientation mechanism of chemical reactions.</p> <p>CO5 - General method of preparations, significances, medicinal uses and other applications of organic</p>

25	BP-302T	Physical Pharmaceutics I - Theory	<p>CO1 - Understand the various physicochemical properties of drug molecules in the designing the dosage form, evaluation of dosage form with respect to solubility of drugs.</p> <p>CO2 - Know the principles of chemical kinetics & use them in designing expiry date for formulation.</p> <p>CO3 - Demonstrate use of physicochemical properties in evaluation of dosage forms with respect to surface and interfacial tension.</p> <p>CO4 - Appreciate physicochemical properties of drug molecules in formulation research and development. Understand the various physicochemical properties of drug molecules in the designing the dosage form based on states of matter and properties of matter.</p> <p>CO5 - Detail understanding on the complexation and protein binding in designing dosage form.</p>
26	BP-303T	Pharmaceutical Microbiology - Theory	<p>CO1 - Understand the historical development and scope of microbiology.</p> <p>CO2 - Learn the morphological classification, culture media for bacteria, virus and fungi, pure culture technique and preservation of cultures. Understand the animal cell culture technology and its application in pharmaceutical industries.</p> <p>CO3 - Understand the methods of identification of bacteria by staining and biochemical reactions and different counting methods.</p> <p>CO4 - To know the sterilization types, its importance and sterility testing of pharmaceutical products.</p> <p>CO5 - Learn the types of Disinfectants and their evaluation and sensitivity testing and minimum inhibitory concentration of Antibiotics.</p>
27	BP-304T	Pharmaceutical Engineering - Theory	<p>CO1 - To know various unit operations used in pharmaceutical industries.</p> <p>CO2 - To understand the material handling techniques.</p> <p>CO3 - To perform various processes involved in pharmaceutical manufacturing process.</p> <p>CO4 - To carry out various test to prevent environmental pollution.</p> <p>CO5 - To appreciate and comprehend significance of plant lay out design for optimum use of resources.</p> <p>CO6 - To appreciate the various preventive methods used for corrosion control in pharmaceutical industries.</p>

28	BP-305P	Pharmaceutical Organic Chemistry II - Practical	<p>CO1 - Purification of organic compounds by different methods like, recrystallization and steam distillation</p> <p>CO2 - Determination of acid value, saponification value and iodine value for fats and oils.</p> <p>CO3 - Preparation of organic compounds by different chemical reactions.</p> <p>CO4 - Calculate the percentage yields of the products obtained by synthesis.</p>
29	BP-306P	Physical Pharmaceutics I - Practical	<p>CO1 - Determination of solubility, CMC of surfactants, % composition of NaCl in a solution using Phenol – Water system by CST method.</p> <p>CO2 - Determination of pKa value.</p> <p>CO3 - Determination of partition coefficient of drug.</p> <p>CO4 - Determination of stability constants.</p> <p>CO5 - Determination of HLB value, surface tension, adsorption of activated charcoal.</p>
30	BP-307P	Pharmaceutical Microbiology - Practical	<p>CO1 - Study the apparatus used in Microbiology.</p> <p>CO2 - Different methods of sterilization and sterility testing of Pharmaceuticals.</p> <p>CO3 - Prepare culture media for the growth of microorganisms.</p> <p>CO4 - Identify and isolate bacteria.</p> <p>CO5 - Perform aseptic procedures for inoculation of microorganisms.</p>
31	BP-308P	Pharmaceutical Engineering - Practical	<p>CO1 - To perform experiments related to unit operations.</p> <p>CO2 - To operate equipment's used in the manufacture of pharmaceutical products.</p> <p>CO3 - To interpret results of the experiments conducted.</p> <p>CO4 - To illustrate the material and energy requirements for optimizing the pharmaceutical unit processes.</p>
Fourth Semester			
32	BP-401T	Pharmaceutical Organic Chemistry III - Theory	<p>CO1 - Definition and different properties of organic compounds.</p> <p>CO2 - Nomenclature, reaction and its synthesis of different stereo isomers and geometrical isomers.</p> <p>CO3 - Nomenclature, classification, properties and synthesis of some heterocyclic compounds.</p> <p>CO4 - Know the structure and medicinal uses of organic compounds</p> <p>CO5 - Learn the name reactions and its importance.</p>

33	BP-402T	Medicinal Chemistry I - Theory	<p>CO1 - Classify medicinal compounds according to their chemical structure.</p> <p>CO2 - Understand the effect of physico- chemical properties on biological action and drug metabolic pathways.</p> <p>CO3 - Study the mechanism of action, synthesis, metabolic pathways, uses and side effects of drugs.</p> <p>CO4 - Discuss the structural activity relationship of different class of drugs.</p> <p>CO5 - Apply the principles of synthetic chemistry to predict the synthesis of selected drugs.</p>
34	BP-403T	Physical Pharmaceutics II - Theory	<p>CO1 - Understand the various physicochemical properties of drug molecules in the designing the dosage form, evaluation of dosage form with respect to colloidal dispersion.</p> <p>CO2 - Know the principles of chemical kinetics & use them in designing expiry date for formulation.</p> <p>CO3 - Demonstrate use of physicochemical properties in evaluation of dosage forms with respect to Rheology.</p> <p>CO4 - Appreciate physicochemical properties of drug molecules in formulation research and development. Understand the various physicochemical properties of drug molecules in the designing the dosage form based on Coarse dispersion.</p> <p>CO5 - Detail understanding on the Micromeritics in designing dosage form.</p>
35	BP-404T	Pharmacology I - Theory	<p>CO1 - Recognize the basic concepts of pharmacology.</p> <p>CO2 - Explain the different terminologies used in pharmacology.</p> <p>CO3 - Understand the pharmacological actions and classification of different categories of drugs.</p> <p>CO4 - Explain mechanism of drug action of organ system/sub cellular/ macromolecular level.</p> <p>CO5 - Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.</p>
36	BP-405T	Pharmacognosy and Phytochemistry I - Theory	<p>CO1 - To know the techniques in the cultivation and production of crude drugs.</p> <p>CO2 - To know the crude drugs, their uses and chemical nature and adulteration in crude drugs.</p> <p>CO3 - To know the primary and secondary metabolites their classification and to learn about plant products and marine drugs.</p> <p>CO4 - To know the evaluation techniques of herbal drugs.</p> <p>CO5 - To know the traditional systems of medicines</p>

37	BP-406P	Medicinal Chemistry I – Practical	<p>CO1 - Estimate the amount of drug present in the sample and should know the purity of the drugs by using different titrimetric analysis.</p> <p>CO2 - Standardization of different molar/normal solutions.</p> <p>CO3 - Synthesize medicinal compounds by different chemical reaction.</p> <p>CO4 - Purification of organic compounds by different methods like recrystallization and steam distillation.</p> <p>CO5 - Calculate the percentage yield of the products obtained by synthesis.</p>
38	BP-407P	Physical Pharmaceutics II – Practical	<p>CO1 - Determination of particle size & particle size distribution by using sieving method and microscopic method.</p> <p>CO2 - Determination of derived properties of powders (bulk density, true density, porosity and angle of repose)</p> <p>CO3 - Determination of viscosity of the liquid.</p> <p>CO4 - Determination of sedimentation volume.</p> <p>CO5 - Determination of reaction rate constants and accelerated stability studies.</p>
39	BP-408P	Pharmacology I – Practical	<p>CO1 - Identify the appliances used in experimental pharmacology.</p> <p>CO2 - Demonstrate different routes of drug administration in animals.</p> <p>CO3 - Observe the effect of drugs on animal by simulated experiments.</p> <p>CO4 - Able to identify common laboratory animals.</p> <p>CO5 - Recommend procedure for laboratory animal maintenance.</p>
40	BP-409P	Pharmacognosy I – Practical	<p>CO1 - Analyse crude drugs by chemical test.</p> <p>CO2 - Learn the types of Drug evaluation methods</p> <p>CO3 - Evaluate crude drugs by Physical methods.</p> <p>CO4 - Evaluate crude drugs by various microscopic methods.</p> <p>CO5 - Perform quantitative microscopic studies.</p>
Fifth Semester			
41	BP-501T	Medicinal Chemistry II - Theory	<p>CO1 - Understand the chemistry of drugs with respect to their pharmacological activity.</p> <p>CO2 - Know the structure of drugs and their classification, structure and therapeutic values of drugs.</p> <p>CO3 - Know mechanism, metabolic pathway and adverse effects of some drugs.</p> <p>CO4 - Acquire the knowledge about structural activity relationship of different class of drugs.</p> <p>CO5 - Study the chemical synthesis of selected drugs.</p>

42	BP-502T	Industrial Pharmacy I - Theory	<p>CO1 - Know the various pharmaceutical dosage forms and their manufacturing techniques.</p> <p>CO2 - Know various considerations in the development of pharmaceutical dosage forms</p> <p>CO3 - Formulate solid, liquid, and semisolid dosage forms and evaluate them for their Quality.</p> <p>CO4 - Handle the scheduled activities in a pharmaceutical firm.</p> <p>CO5 - Manage the production of large batches of pharmaceutical formulations.</p>
43	BP-503T	Pharmacology II - Theory	<p>CO1 - Define and classify different tissues and explain how the organ and organ systems are related to physiological and pathological conditions.</p> <p>CO2 - Understand the mechanism of drug action and its relevance in the treatment of different diseases.</p> <p>CO3 - Understand the classification of different categories of drugs.</p> <p>CO4 - Explain the synthesis, functions, regulation and bioassay of different hormones and autacoids.</p> <p>CO5 - Understand the pharmacology of different category of drugs.</p>
44	BP-504T	Pharmacognosy and Phytochemistry II - Theory	<p>CO1 - Understand modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents.</p> <p>CO2 - Explain metabolic pathways, their determination and understand utilization of radioactive isotopes in the investigation of biogenetic studies.</p> <p>CO3 - To Analyse crude drugs by various chemical test. Study of secondary metabolites.</p> <p>CO4 - Understand and apply various chromatographic techniques like paper chromatography.</p> <p>CO5 - To Perform distillation of volatile oil and detect phytoconstituents by TLC.</p>
45	BP-505T	Pharmaceutical Jurisprudence - Theory	<p>CO1 - The pharmaceutical legislation and their implications in the development and marketing.</p> <p>CO2 - Various Indian Pharmaceutical Acts and Laws.</p> <p>CO3 - The regulatory authorities and agencies governing the manufacture and sale of Pharmaceuticals.</p> <p>CO4 - The code of ethics during the Pharmaceutical Practice.</p> <p>CO5 - Constitution, functions, Offences, Penalties, rules, regulations, Prohibitions, manufacture, sales, licensing related to various pharmaceutical product laws.</p>

46	BP-506P	Industrial Pharmacy I – Practical	<p>CO1 - Prepare formulations of different dosage forms as per the batch formula.</p> <p>CO2 - Select suitable packaging container for a dosage form.</p> <p>CO3 - Operate different equipment's used in preparation of dosage forms.</p> <p>CO4 - Relate the physicochemical properties of drugs to dosage form characteristics.</p> <p>CO5 - Evaluate different dosage forms by performing quality control tests.</p>
47	BP-507P	Pharmacology II – Practical	<p>CO1 - Choose physiological salt solution for isolated tissue preparations.</p> <p>CO2 - Demonstrate the appliances used in bioassay and explain the recording procedure of bioassay.</p> <p>CO3 - Demonstrate drug effects using computer models.</p> <p>CO4 - Demonstrate the various receptor actions using isolated tissue preparation.</p> <p>CO5 - Demonstrate isolation of different organs/ tissues from the laboratory animals by simulated experiments.</p>
48	BP-508P	Pharmacognosy II – Practical	<p>CO1 - To study histology, morphology, powder characteristics and extraction of various crude drugs.</p> <p>CO2 - Discuss isolation and detection of active principles present in various crude drugs.</p> <p>CO3 - Study of various chromatographic techniques.</p> <p>CO4 - Distillation of volatile oils and detection of phytoconstituents by TLC.</p> <p>CO5 - Analysis of crude drugs by Chemical tests.</p>
Sixth Semester			
49	BP-601T	Medicinal Chemistry III - Theory	<p>CO1 - Explain the basis of chemotherapy.</p> <p>CO2 - Understand the importance of drug design and different techniques of drug design.</p> <p>CO3 - Understand the chemistry, structure of drugs with respect to their classification, metabolism, metabolic pathway, adverse effects and therapeutic value of some drugs.</p> <p>CO4 - Acquire knowledge about structural activity relationship of some drugs.</p> <p>CO5 - Apply the principles of synthetic chemistry to predict the synthesis of selected drugs.</p>
50	BP-602T	Pharmacology III - Theory	<p>CO1 - Understand the mechanism of drug action & its relevance in the treatment of different infectious diseases.</p> <p>CO2 - Explain principles of chemotherapy of diseases and mechanisms of bacterial resistance and Pharmacology of antibiotics.</p> <p>CO3 - Summarize the pharmacology of Anti neoplastic drugs and Immunopharmacological drugs.</p> <p>CO4 - Comprehend the principles of toxicology and treatment of various poisonings.</p> <p>CO5 - Appreciate correlation of pharmacology with medical sciences.</p>

51	BP-603T	Herbal Drug Technology - Theory	<p>CO1 - Explain raw material as source of Herbal Drugs for cultivation to herbal drug Product and GAP.</p> <p>CO2 - To Understand different biodynamic agricultural techniques giving emphasis on organic farming and appropriate uses of bio pesticides and bio insecticides.</p> <p>CO3 - Explain different Indian system of medicine along with preparation and standardization of Ayurvedic formulations.</p> <p>CO4 - Understand the IPR, WHO, ICH, AYUSH, FAO, ICAR, CMAP guidelines for evaluation of herbal drugs and explain medicinal plant research.</p> <p>CO5 - Discuss regulatory issues along with in details study of regulations regarding ASU drugs.</p> <p>CO6 - Discuss herbal cosmetics, Nutraceuticals, and explain herb drug interaction.</p> <p>CO7 - Discuss herbal excipients and Formulation and their usage based on current trends like phytosomes.</p> <p>CO8 - Explain patenting of herbal drugs andGMP.</p>
52	BP-604T	Biopharmaceutics and Pharmacokinetics - Theory	<p>CO1 - Understand the basic concepts in Biopharmaceutics & pharmacokinetics.</p> <p>CO2 - Use Plasma data & derive the pharmacokinetic parameters to describe the process of drug absorption, distribution, metabolism & elimination.</p> <p>CO3 - Critically evaluate biopharmaceutical studies involving drug product equivalency.</p> <p>CO4 - Design and evaluate dosage regimen of the drugs using pharmacokinetics and Biopharmaceutics parameters.</p> <p>CO5 - Detect potential clinical pharmacokinetic problems and apply basic pharmacokinetic principles to solve them and to understand the kinetics of the drugs following Nonlinearity and also the pathways involved in biotransformation of drugs.</p>
53	BP-605T	Pharmaceutical Biotechnology - Theory	<p>CO1- Understanding the importance of Immobilized enzymes in Pharmaceutical Industries</p> <p>CO2- Genetic engineering applications in relation to production of pharmaceuticals</p> <p>CO3- Importance of Monoclonal antibodies in Industries</p> <p>CO4- Appreciate the use of microorganisms in fermentation technology</p>
54	BP-606T	Quality Assurance - Theory	<p>CO1 - will have knowledge on various definition aspects of quality assurance and quality control.</p> <p>CO2 - Understand the importance of good practice such as good manufacturing practice and good laboratory practice in Pharm industry.</p> <p>CO3 - Understand the importance of documentation.</p> <p>CO4 -Acquire knowledge on various quality assurance system process and current regulatory guidelines related to pharmaceutical industry.</p> <p>CO5 -Develop knowledge on manufacturing of pharmaceutical substances in different department.</p>

55	BP-607P	Medicinal chemistry III – Practical	<p>CO1 - Analyze the purity of medicinal compounds.</p> <p>CO2 - Standardization of solutions by different titrimetric analysis.</p> <p>CO3 - Synthesize medicinal compounds by different chemical reaction and purify using recrystallisation, calculate percentage yield.</p> <p>CO4 - Draw chemical structures and reactions by Chemdraw software.</p> <p>CO5 - Explain the physico-chemical properties of drugs using drug design software.</p>
56	BP-608P	Pharmacology III – Practical	<p>CO1 - Estimation of biochemical parameters by instrumentation methods.</p> <p>CO2 - Determination of oral toxicity studies on experimental animal models.</p> <p>CO3 - Assessment of various biostatistical methods for experimental pharmacology.</p> <p>CO4 - Know the various agonist & antagonist effect of drugs on in vitro animal preparations.</p>
57	BP-609P	Herbal Drug Technology – Practical	<p>CO1 - To Understand the preliminary phytochemical screening of crude drugs.</p> <p>CO2 - Determine alcohol content of aśvas and arishtas and evaluate excipients of natural origin.</p> <p>CO3 - Prepare and standardize cosmetic formulation and study of monograph analysis of herbal drugs.</p> <p>CO4 - Prepare and standardize extract in formulation like syrups etc.</p> <p>CO5 - Determination of total alkaloid, phenol and aldehyde content.</p>
Seventh Semester			
58	BP-701T	Instrumental method of Analysis - Theory	<p>CO1 - Understand the interaction of matter with electromagnetic radiation its theoretical principles and instrumentation.</p> <p>CO2 - Learn the basic concepts of chromatography and various chromatography techniques for separation</p> <p>CO3 - Explain theory and instrumentation of chromatography.</p> <p>CO4 - Learn the various applications of spectroscopy</p> <p>CO5 - Learn application of various chromatography techniques for organic inorganic and natural products.</p>
59	BP-702T	Industrial Pharmacy II - Theory	<p>CO1 - Know the process of pilot plant and scale up of pharmaceutical dosage forms.</p> <p>CO2 - Understand the process of technology transfer from lab scale to commercial batch.</p> <p>CO3 - Know different Laws and Acts that regulate pharmaceutical industry.</p> <p>CO4 - Understand the approval process and regulatory requirements for drug product.</p> <p>CO5 - Quality assurance, Quality system, Design.</p>

60	BP-703T	Pharmacy Practice - Theory	<p>CO1 - Know the various drug distribution methods in hospital.</p> <p>CO2 - Monitor drug therapy of patient through medication chart review and clinical review.</p> <p>CO3 - Detect and assess adverse drug reaction.</p> <p>CO4 - Interpret selected laboratory results of specific disease state.</p> <p>CO5 - Appreciate the concept of rational drug therapy.</p>
61	BP-704T	Novel Drug Delivery System - Theory	<p>CO1 - Describe the various approaches for development of Novel Drug Delivery Systems.</p> <p>CO2 - Categorize the various criteria for selection of drugs and polymers for the development of Novel drug delivery systems/Controlled release drug delivery system and their Formulation & Evaluation.</p> <p>CO3 - Know the criteria for selection of drugs and polymers for the development of Micro-particulates, Mucosal drug delivery, Implants and their Formulation & Evaluation.</p> <p>CO4 - Design and Evaluate the different types of controlled release drug delivery for various routes like Transdermal, Gastro-retentive drug delivery & Naso-pulmonary drug delivery systems. And also, to know the Concepts and approaches for Targeted drug delivery systems using Various Carriers.</p> <p>CO5 - Understand the concepts and development of Ocular drug delivery systems and IUD'S.</p>
62	BP-705P	Instrumental Methods of Analysis – Practical	<p>CO1 - Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis.</p> <p>CO2 - Understand the chromatographic separation and analysis of drugs.</p> <p>CO3 - Perform quantitative & qualitative analysis of drugs using various analytical Instrument.</p> <p>CO4 - Understand the factors affecting fluorescence intensity during the same analysis</p> <p>CO5 - Prepare reports and laboratory notebooks</p>

63	BP-706PS	Practice School	<p>Pharmaceutics: CO1 - Demonstrate different aspects of microspheres CO2 - Preparation of microspheres by different methods. CO3 - Evaluation techniques and application of microspheres. CO4 - Introduction to UGC care list of journals, Scopus index, ISSN, eISSN, ISBN, Impact factor, H Index, I Index, ORCHID etc CO5 - Tools and software to detect Plagiarism.</p> <p>Pharmacognosy: CO1 - Demonstrate different types of chromatographic techniques. CO2 - Conventional extraction techniques and tissue culture crude drugs. CO3 - Adapt with the WHO guidelines for quality control of crude drugs. CO4 - Introduction to UGC care list of journals, Scopus index, ISSN, eISSN, ISBN, Impact factor, H Index, I Index, ORCHID etc CO5 - Tools and software to detect Plagiarism.</p> <p>Pharmaceutical Chemistry: CO1 - Develop purification process for different organic solvent. CO2 - Development of TLC plates and process. CO3 - Recrystallization of different organic compounds. CO4 - Introduction to UGC care list of journals, Scopus index, ISSN, eISSN, ISBN, Impact factor, H Index, I Index, ORCHID etc CO5 - Tools and software to detect Plagiarism.</p> <p>Pharmacology: CO1 - Design different techniques of animal handling. CO2 - Develop different techniques of blood collection and breeding of animals. CO3 - Selection of appropriate in vitro tests. CO4 - Introduction to UGC care list of journals, Scopus index, ISSN, eISSN, ISBN, Impact factor, H Index, I Index, ORCHID etc CO5 - Tools and software to detect Plagiarism.</p>
Eight Semester			

64	BP-801T	Biostatistics and Research Methodology	<p>CO1 - Introduction to biostatistics, understand statistical techniques such as measures of central tendency, measures of dispersion and correlation</p> <p>CO2 - Know the statistical techniques such as regression, probability, parametric and non- parametric tests</p> <p>CO3 - Learn about need of research, graphs and to understand designing the methodology (observational studies)</p> <p>CO4 - To understand various phases of clinical trials and know operation of design of experiments DoE (Design of Experiment), M.S. Excel, SPSS, R and MINITAB®</p> <p>CO5 - To understand the applications of Biostatics in Pharmacy, appreciate statistical techniques in solving the problems.</p>
65	BP-802T	Social and Preventive Pharmacy	<p>CO1 - Realization of current issues related to health and pharmaceutical problems.</p> <p>CO2 - Importance and implementation of functioning and outcome of National health programs.</p> <p>CO3 - Measurements for the prevention and control of different health or clinical related issues.</p> <p>CO4 - Intervention programme to control the social, nutrition, hygiene, culture related health issues and for the different aged group people nationally.</p> <p>CO5 - Evaluation of alternative ways of solving problems related to health and pharmaceutical issues.</p>
66	BP-803ET	Pharma Marketing Management	<p>CO1 - Marketing concepts and techniques and the application of the same in the pharmaceutical industry.</p> <p>CO2 - Market research and distribution channels along with their implementation in the pharmaceutical industry.</p> <p>CO3 - Concepts of branding and product management.</p> <p>CO4 - Theories on promotion, sales and pricing of a Product.</p> <p>CO5 - To impart the Knowledge and Know- how of marketing management groom the people for taking a challenging role in Sales and Product management.</p>
67	BP-804ET	Pharmaceutical Regulatory Science	<p>CO1 - Know about the process of drug discovery and development.</p> <p>CO2 - Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.</p> <p>CO3 - Know the regulatory approval process and their registration in Indian and international markets</p> <p>CO4 - Regulatory Concepts, Guidance, Laws and acts</p> <p>CO5 - Clinical trials, Pharmacovigilance, Regulatory approval process.</p>

68	BP-805ET	Pharmacovigilance	<p>CO1 - Importance of drug safety monitoring. CO2 - History and development of pharmacovigilance.</p> <p>CO3 - National and international scenario of pharmacovigilance.</p> <p>CO4 - Dictionaries, coding and terminologies used in pharmacovigilance</p> <p>CO5 - Detection of new adverse drug reactions and their assessment.</p> <p>CO6 - International standards for classification of diseases and drugs.</p> <p>CO7 - Adverse drug reaction reporting systems and communication in pharmacovigilance.</p> <p>CO8 - Methods to generate safety data during pre-clinical, clinical and post approval process of drug's life-cycle.</p> <p>CO9 - Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation.</p> <p>CO10 - Pharmacovigilance programme of India (PVPI), requirement for ADR reporting in India.</p> <p>CO11 - ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning.</p> <p>CO12 - CIOMS requirements for ADR reporting. Writing case narratives of adverse events and their quality.</p>
69	BP-806ET	Quality Control and Standardization of Herbals	<p>CO1 - Explain the WHO guidelines for herbal drugs.</p> <p>CO2 - Describe the quality assurance processes in herbal drug industry.</p> <p>CO3 - Describe the regulatory approval processes and their registration in Indian and International markets.</p> <p>CO4 - Discuss the application of chromatographic techniques in standardization of herbal drugs.</p> <p>CO5 - Discuss EU and ICH guidelines for quality control of herbal drugs.</p> <p>CO6 - Prepare the documents for New Drug Application and herbal drugs export registration.</p>
70	BP-807ET	Computer Aided Drug Design	<p>CO1 - Explain the design and discovery of lead molecules.</p> <p>CO2 - Understand the role of drug design in drug discovery process.</p> <p>CO3 - Explain the concept of QSAR and docking.</p> <p>CO4 - Predict various strategies to develop new drug like molecules.</p> <p>CO5 - Design new drug molecules using molecular modelling software.</p>
71	BP-808ET	Cell and Molecular Biology	<p>CO1 - Outline cell and history of molecular biology, cellular functioning and composition. CO2 - Describe the chemical foundation and DNA properties of cell biology.</p> <p>CO3 - Know the protein structure and function.</p> <p>CO4 - Describe basic molecular genetic mechanisms.</p> <p>CO5 - Describe the cell cycle.</p>

72	BP-809ET	Cosmetic Science	<p>CO1 - Known the regulations pertaining to Cosmetics and Cosmetic excipients as Per Indian & EU regulations. And also, will be able to describe the role of key components and building blocks used in different cosmetic products with the basic knowledge of the structure & functions of the skin, hair, oral cavity and problem associated.</p> <p>CO2 - Understand the formulations and development of various cosmetic products for- skin care, oral care and hair care.</p> <p>CO3 - Understand the role of herbs used in Cosmetics and Justify the need for skin care, hair care and sun screen products along with the fundamentals for their formulations.</p> <p>CO4 - Know the Scientific learning's to develop cosmetic and cosmeceuticals with desired safety, sensory, stability & efficacy (evaluation) for various skin care, hair care &oral problems.</p> <p>CO5 - Understand the formulation and developments of Antiperspirants and deodorants, types of skin and hair and problems associated with them.</p>
73	BP-810ET	Experimental Pharmacology	<p>CO1 - Describe the regulatory guidelines for maintenance and conduct of experiments on laboratory animals.</p> <p>CO2 - Appreciate the applications of various commonly used laboratory animals.</p> <p>CO3 - Design the protocol for pre-clinical drug discovery.</p> <p>CO4 - Expertise in routes of drug administration and blood withdrawal techniques using animals.</p> <p>CO5 - Appreciate and demonstrate the importance of biostatistics and research methodology.</p>
74	BP-811ET	Advanced Instrumentation Techniques	<p>CO1 - To understand various techniques and methods of different types of Spectrometers.</p> <p>CO2 - To understand the advanced instruments used and its applications in drug analysis.</p> <p>CO3 - To understand the chromatographic separation and analysis of drugs.</p> <p>CO4 - To understand the calibration of various analytical instruments.</p> <p>CO5 - To know analysis of drugs using various analytical instruments.</p> <p>CO6 - To impart knowledge on NMR and Mass spectrometry.</p>

75	BP-812ET	Dietary Supplements and Nutraceuticals	<p>CO1 - Understand the need of supplement by the different groups of people to maintain a healthy life.</p> <p>CO2 - Understand the outcome of deficiency in dietary supplements.</p> <p>CO3 - Appreciate the regulatory and commercial aspects of dietary supplements including health claims.</p> <p>CO4 - Describe the components in dietary supplements and their application.</p> <p>CO5 - Know the complete knowledge about free radicals and antioxidants.</p>
76	BP-813PW	Project Work	<p>CO1 - Demonstrate a sound technical knowledge of their selected project topic.</p> <p>CO2 - Undertake problem identification, formulation and solution.</p> <p>CO3 - Design formulations solutions to complex problems utilizing a systems approach.</p> <p>CO4 - Conduct a pharmaceutical project.</p> <p>CO5 - Communicate with formulation scientist and the community at large in written and oral forms.</p>

